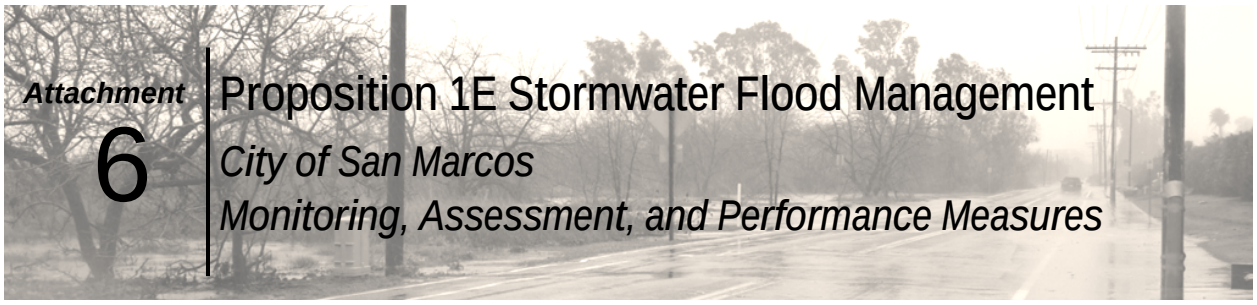

Attachment 6

Proposition 1E Stormwater Flood Management

City of San Marcos

Monitoring, Assessment, and Performance Measures

Attachment 6 consists of the following items:

- ✓ **Performance Measures.** The purpose of this attachment is to describe the monitoring, assessment, and performance measures that will be used to evaluate the *San Marcos Creek Floodway Improvement Project*. These measures will ensure that this proposal meets its intended goals, achieves measurable outcomes, and provides value to the Region and the State of California.

Specific monitoring and performance measures have been developed to assess performance of the *San Marcos Creek Floodway Improvement Project* on an ongoing basis. The purpose of this attachment is to provide a discussion of the monitoring system to be used to quantify and verify project performance with respect to the project benefits or objectives identified.

This attachment will also discuss how monitoring data will be used to measure the performance in meeting the overall goals and objectives of the San Diego IRWM Plan. As such, this attachment contains a Project Performance Measures table, which includes the following:

- Project goals
- Desired outcomes
- Output indicators – measures to effectively track output
- Outcome indicators – measures to evaluate change that is a direct result of the work
- Measurement tools and methods
- Targets – measureable targets that are feasible to meet during the life of the project

Performance Measures

The *San Marcos Creek Floodway Improvement Project* is intended to make improvements to the San Marcos Creek channel in order to reduce flood hazards, reduce stormwater runoff, and reduce the pollutant load and volume of runoff entering San Marcos Creek and Lake San Marcos. In addition, by improving water quality within the project area, this project will increase the availability and quality of local water supply in Lake San Marcos. To ensure that the project meets intended goals, assessments or monitoring programs will be implemented to document progress.

Project Goals

Reduce flood damage impacts by protecting infrastructure and ecosystems, and avoiding public safety and health impacts associated with flooding: This project will reduce flooding in the downtown San Marcos area by restricting 100-year flood flows to the San Marcos Creek channel from Bent Avenue/Craven Road west to the west end of Discovery Street. This will substantially reduce infrastructure, ecosystem, public safety, and health impacts that are associated with flooding hazards.

Monitoring for flood control improvements will include annual evaluations of operations and maintenance costs to the City of San Marcos due to cleanup following flooding events. In addition, the City will monitor and track the extent of the 100-year floodplain following project completion.

Improve quality and availability of surface water supplies in Lake San Marcos that are used by golf course and agricultural uses by restoring natural stream function in upstream areas: Improvements to the San Marcos Creek floodway will help to improve surface water quality, thereby increasing potential water supplies available to local users. Water quality improvements will include reductions in nutrient, total suspended solids (TSS), and total dissolved solids (TDS) loading in urban runoff by increasing the amount of riparian vegetation that intercepts stream flows. Poor water quality is a widely acknowledged problem in the San Marcos Creek watershed and ongoing use of Lake San Marcos water supply for golf course irrigation could be hampered without the necessary treatment.

Monitoring local water supply availability will be conducted by monitoring the surface water elevation within Lake San Marcos. The City will partner with the lake owner, the Citizens Development Corporation (CDC), and other stakeholders to monitor the lake surface elevation and water quality as part of the ongoing total maximum daily load (TMDL) effort.

Reduce hydromodification effects by improving the North Storm Drain System and by protecting, restoring, and enhancing San Marcos Creek: The project will create improvements to San Marcos Creek and the North Storm Drain System, which will slow stormwater velocities, reduce erosion and scour, and improve water quality within San Marcos Creek. The implementation plan for the Upper San Marcos Creek Watershed Nutrient Management Plan (City of San Marcos et al 2010) stipulates that the City of San Marcos will work jointly with other agencies to conduct a collaborative watershed monitoring project. Water quality monitoring for the proposed *San Marcos Creek Floodway Improvement Project* will be coordinated with that effort, as well as the stakeholder TMDL effort associated with Lake San Marcos.

This project objective will be measured by water quality monitoring completed after project construction as part of the stakeholder TMDL effort that is overseen by the San Diego Regional Water Quality Control Board (RWQCB). Reducing nutrient and pollutant loading into San Marcos Creek and Lake San Marcos will be monitored by water quality sampling and analysis. Automated samplers and flow meters will collect flow-weighted composite samples during storm events. Runoff quantity will be measured, which will allow for the direct estimate of total reduction of runoff volume.

Improve water quality by increasing controls for sediment, nutrients, and bacteria into San Marcos Creek and its tributaries: Lake San Marcos and San Marcos Creek are heavily impacted by runoff-related pollutants such as sediment, nutrients and bacteria. The implementation plan for the Upper San Marcos Creek Watershed Nutrient Management Plan (City of San Marcos et al 2010) stipulates that the City of San Marcos will work jointly with other agencies to conduct a collaborative watershed monitoring project. As such, water quality monitoring for the proposed *San Marcos Creek Floodway Improvement Project* will be coordinated with that effort and overseen by the San Diego RWQCB.

Results of these water quality monitoring efforts will be compared for years before and after implementation of the project to measure relative improvements in local water quality. Reducing nutrient and pollutant loading into San Marcos Creek and Lake San Marcos will be monitored by water quality sampling and analysis. Automated samplers and flow meters will collect flow-weighted composite samples during storm events. Runoff quantity will be measured, which will allow for the direct estimate of total reduction of runoff volume.

Provide ecosystem restoration through habitat restoration, ecosystem improvement and preservation, and fish and wildlife protection and enhancement: This project will include habitat and ecosystem improvements through project components and mitigation efforts that will aim to restore natural vegetation within San Marcos Creek. All channel revegetation activities will seek to restore native riparian and aquatic plants and habitats.

Success criteria for these efforts will include survivorship, height and percentage of groundcover / understory / over story coverage. In addition, the City of San Marcos will compare existing vegetative and habitat conditions to post-project conditions on a semi-annual basis.

Increase recreational opportunities and public access by protecting nearby recreational uses and improving the quality of recreational and public access: San Marcos Creek drains into Lake San Marcos, which provides many recreational and aesthetic benefits. By implementing this project, excessive bacteria loading from urban runoff entering San Marcos Creek and Lake San Marcos will be reduced. In addition,

through habitat restoration and other improvements to San Marcos Creek, the recreational value of this water body will be substantially increased.

The project objective will be monitored by tracking the acreage of creek restoration area accessible to the public following completion of the project, as well as Index of Biotic Integrity (IBI) scores.

Monitoring System

Baseline data regarding existing conditions, pre-restoration, and enhancement will be gathered and reported in the environmental documentation and permitting required for this project. A mitigation and monitoring plan will also be prepared and approved by the City of San Marcos and regulatory agencies (California Department of Fish and Game, San Diego RWQCB, and U.S. Army Corps of Engineers). In addition, baseline data from previously conducted monitoring efforts from the Upper San Marcos Creek Watershed Nutrient Management Plan (City of San Marcos et al 2010) and stakeholder TMDL data approved by the San Diego RWQCB will be compiled and analyzed as necessary.

Monitoring of the creek restoration project will be conducted on both a qualitative and quantitative basis. Qualitative data will be collected regarding plant health and development, effectiveness of the floodway improvements, and improvements to local water quality. Qualitative monitoring will be performed by the City staff or an approved contractor annually, then semi-annually for a period of 3-5 years until the project has met its stated goals. Quantitative monitoring will consist of the collection of vegetation data. Data consist of vegetation cover, height and make up and survivorship of plantings. Permanent photo points will also be established. Data will be analyzed and an annual report prepared as necessary to the City Council and/or permitting agencies for 3-5 years until the success criteria are met. Data shall be collected and maintained by City of San Marcos staff.

The data management and monitoring deliverables described herein are consistent with the IRWM Plan Standards and Guidance – Data Management Standard and will be used by the San Diego IRWM region to evaluate project performance. In addition, monitoring and assessment of the *San Marcos Creek Floodway Improvement Project* is consistent with the *Water Quality Control Plan for the San Diego Basin 9 (Basin Plan)* and will be used by the San Diego RWQCB to evaluate watershed health.

Alignment with IRWM Goals

As demonstrated within Attachment 3, the project objectives established for the *San Marcos Creek Floodway Improvement Project* align with the objectives of the San Diego IRWM Plan such that this project would meet seven of the nine IRWM Plan objectives. The monitoring data presented in Table 6-1 below will be used to concurrently track success of the *San Marcos Creek Floodway Improvement Project* goals while also measuring the performance of the project in meeting the overall goals and objectives of the IRWM Plan. This monitoring data will be provided to the San Diego IRWM program for use in tracking the success of funded projects.

Table 6-1: Project Performance Measures

Benefit Type	Project Goals	Desired Outcomes	Output Indicators	Outcome Indicators	Measurement Tools and Methods	Targets
Reduced Flooding	Reduce flood damage impacts by protecting infrastructure and ecosystems, and avoiding public safety and health impacts associated with flooding	Reduce the 100-year floodplain such that it is contained within the San Marcos Creek Floodway	Number of post-storm cleanup efforts required by the City of San Marcos	Reduced cleanup efforts following extreme wet weather events	City of San Marcos Work Orders for flood-related cleanups	Reduce the annual amount of money spent by the City for emergency response and street sweeping efforts following extreme wet weather events
Increase Local Water Supply	Improve quality and availability of surface water supplies in Lake San Marcos that are used by golf course and agricultural uses by restoring natural stream function in upstream areas	Increased quality and quantity of local water supply in Lake San Marcos	Total storm water flow from project drainage area into Lake San Marcos	Increase in water surface elevation after storm events, showing that floodway properly directed storm flows	Water surface elevation data	Maintain water surface elevation in Lake San Marcos
Reduction in Storm Water Flows	Reduce hydromodification effects by improving the North Storm Drain System and by protecting, restoring, and enhancing San Marcos Creek	Reduce source pollutants including nutrients and bacteria, from entering water bodies downstream of the project	Reduce levels of nutrients and bacteria in Lake San Marcos	Reduced storm water runoff flows and reduced pollutant loads	Water quality monitoring data from the Nutrient Management Plan and TMDL stakeholder group	Reduce total pollutant loads
Water Quality Improvements	Improve water quality by increasing controls for sediment, nutrients, and bacteria into San Marcos Creek and its tributaries	Make improvements to the water quality of Lake San Marcos and San Marcos Creek in accordance with TMDL standards	Total sediment/ nutrient loading into Lake San Marcos	Reduced nutrient loading into Lake San Marcos to levels established within the Basin Plan water quality objectives	Water quality monitoring data from the Nutrient Management Plan and TMDL stakeholder group	Reduce nutrients and bacteria pollutant loads

Benefit Type	Project Goals	Desired Outcomes	Output Indicators	Outcome Indicators	Measurement Tools and Methods	Targets
Creek Restoration	Provide ecosystem restoration through habitat restoration, ecosystem improvement and preservation, and fish and wildlife protection and enhancement	Successful implementation of restoration efforts in and around San Marcos Creek	Qualitative and quantitative data on habitat quality	Monitoring and data analysis of restoration site (survivorship of container plants, percent vegetative cover) Increased observations of wildlife use	Visual observations, survivorship evaluation, maintaining high vegetative cover of native species	Meeting habitat-related mitigation requirements and increasing plant survivorship
Recreational Improvements	Increase recreational opportunities and public access by protecting nearby recreational uses and improving the quality of recreational and public access	Increase open space areas that provide recreational opportunities	Acreage of creek restoration area accessible to the public	Amount of open space (restored habitat areas) available to the public	Evaluation of restored habitat area in San Marcos Creek Evaluation of IBI scores	Increasing the amount and quality of recreational area available within the project area Improving IBI scores